ESO 425

# STORAGE OF TEMPERATE CROP FRUITS & VEGETABLES IN THE ALTIPLANO -- GUATEMALA, C.A.

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# STORAGE PROGRAM FOR FRUITS & VEGETABLES IN THE HIGHLANDS, GUATEMALA

There is much interest among present cooperative Federation management, in local cooperatives and among farmers about storing crops in order to achieve a better price. Storage of crops, although simple in appearance, is complex and technical in nature, specific to each commodity, and carries a substantial financial risk. Storage programs should not be entered into lightly.

Storage, as used here, supposes a longer period of time than a few days that is envisioned for the marketing facilities and program described for the 1978-83 period. Storage, as used here, involves a time period of several weeks to several months.

In addition to technical risks, which may result in loss in quality or loss of the crop, there are substantial economic risks. Relatively few crops in Guatemala during the 1973-76 period had price changes at a regular and cyclical nature which could result in lessening the price risk of holding crops in storage. To reinforce this point, every storage program tried in Guatemala by farm groups in recent years has resulted in a loss of money for the program. These losses reflected both the technical aspects of storage and the price risks involved, as well as marketing management.

Only five vegetables and one fruit crop in Guatemalan Highlands during the period 1973-76 had price cycles of some regularity which would make storage programs less risky, less speculative. A marketing organization cannot and must not expose their organization and their members to storage programs where there is a high degree of risk associated with price change.

The five vegetables whose price changes had some predictable cyclical activity were carrots, beets, potatoes, onions and garlic; the one fruit is apples. All of these cycles are months long. The typical low periods and high periods in price are identified on the next page.

Because of long time periods involved, uncertain payoffs, and seasonal price differences, only the onion, potato, garlic and apple crops appear to be candidates for storage for more than a few days by a marketing organization at this time. Short term, limited holdings may, over the 1978-83 period, provide some valuable experience which would be useful in considering storage, related payoffs and the risks associated with these payoffs.

One of the functions of the new marketing cooperative should be to accumulate daily price and quantity information for the fruit and vegetable crops under consideration. This kind of historical information useful in storage decisions is not available today. As this information accumulates, decisions about storage can be more rational.

| Crop | Low Price Period<br>Crop Into Storage | High Price Period<br>Product Out of Storage |
|---|---|---|
| Carrots | Oct., Nov., Dec. | March, April, May |
| Beets | Sept., Oct., Nov. | April, May, June |
| Potatoes | July, Aug., Sept. | Feb., March, April |
| Onions | April, May | Sept., Oct. |
| Garlic | Feb., March | October |
| Apples | Sept., Oct. | Dec., Jan. |

It is proposed that storage plans, programs and facilities be activated as soon as the marketing cooperative is fully operational. In 1980-81, the marketing cooperative should be approaching a breakeven point financially. At this time, storage programs should be activated.

The location and specialty of storage facilities is suggested below:

Potato Storage

| | |
|---|---|
| 1 in Tejutla | 1200 M.T. |
| 1 in Quezaltenango | 900 M.T. |

Garlic Storage

| | |
|---|---|
| 1 in Huehuetenango | 600 M.T. |

Onion Storage

| | |
|---|---|
| 1 in Solola | 600 M.T. |
| 1 in Quezaltenango | 600 M.T. |

Apple Storage

| | |
|---|---|
| 1 in Saloma/San Juan Ixcoy | 250 M.T. |
| 1 in Quezaltenango | 250 M.T. |

The subject of storage, crops stored, size and location of storage should be the subject of further consultation with experts on storage each of these commodities.

Where garlic, potato and onion storage are expected to be used for only a few weeks, unrefrigerated storage located in the higher elevations (above 8000 feet) may well be satisfactory. If storage periods are contemplated, which may be longer than 3 months, then refrigerated storage must be used. Both temperature and humidity control are essential, regardless of whether refrigeration or natural storage is used. Because long storage periods, four to six months, are indicated for the four crops under consideration, all storages are planned as refrigerated facilities.

In planning the capital budget and the storage program income statements over the initial five year period (1982-87), most facilities are to be located on the same site as the regional assembling, grading and packing plants. The two possible exceptions are a potato storage in the Tejutla area and an apple storage in the San Juan Ixcoy/Saloma area. Some advantage would accrue to these locations because of higher altitude (lower refrigeration costs) and the fact that they are located near concentrations of production. Even these two facilities, however, could well be located at one of the regional centers--the Tejutla storage at Quezaltenango, and the San Juan Ixcoy/Saloma storage at the Huehuetenango regional market. This final decision can best be made as concentrations of members develop during the first years of operation of the regional centers.

When developing budgets for storage programs, buying of the four crops would begin in the normally low priced months when the farm price declined to a point 10 percent or more below the historical average price for that crop. The buying price is thus assumed to be not more than 90 percent of the average farm retail price for the previous three years. This kind of data should be accumulated as a part of the information program developed by the marketing organization.

The selling price is identified as the average price during the two or three month period when prices for these crops are normally at their peak for the year.

A shrink factor (loss of weight and value) of the crops put into storage of 6 percent is applied to the quantity sold out of storage. This assumes rigorous controls on temperature and humidity within the storage to maintain the requirements recommended for the crops stored.

Only the top grade of crops should be stored. Lesser grades will not usually pay back storage charges as these grades command a lower price at any season. The crops in storage will need to be constantly inspected to observe any potential loss which may be developing. This factor is an added reason for locating as many storage facilities as possible at the site of the regional marketing facility, rather than an isolated location.

The capital budget which follows has allowed for considerable increase in costs because of inflation.

The income statements for the first year of operation (1982-83) plan on the storage being utilized at 50 percent of capacity for the first year, at 75 percent of capacity the third year, and at 90 percent of capacity the fifth year. It is very possible that with favorable weather early in the 5 year period, the storage program could operate at close to capacity the first or second year.

The storage capacities have deliberately been sized rather conservatively. A storage program by nature is a business where most costs are fixed, or noncontrollable after the storage program is in operation. In this setting, it is important to realize the financial breakeven point is rather high (near 75 percent of operating capacity) and that small errors in pricing judgment or in quality maintenance can quickly produce losses for the entire year. In most cases, the capacity of each storage has been understated. In some cases, the space may actually hold as much as 125 percent of stated capacity with very careful space utilization.

Table 1. Storage Capital Budget

| | | |
|---|---|---|
| Tejutla Potato Storage - 1200 M.T. [1/] | | |
| 25M x 40M x 4M | 1000M$^2$ @ $250 | $250,000 |
| Quezaltenango Potato, Onion & Apple Storage | | |
| 25M x 60M x 4M | 1500M$^2$ @ $250 | 375,000 |
| Three separate storage rooms | | |
| 25M x 32M for potatoes | 900 M.T. | |
| 25M x 16M for onions | 600 M.T. | |
| 25M x 10M for apples | 250 M.T. | |
| Huehuetenango Garlic Storage | | |
| 25M x 16M x 4M | 400M$^2$ @ $250 | 100,000 |
| San Juan Ixcoy/Saloma Apple Storage 250 M.T. [2/] | | |
| 25M x 10M x 4M | 250M$^2$ @ $250 | 62,500 |
| Teepan/Solola Onion Storage 600 M.T. | | |
| 25M x 16M x 4M | 400M$^2$ @ $250 | 100,000 |
| Miscellaneous Equipment | | 92,500 |
| Total Capital Investment [3/] | | $980,000 |

1/ Tejutla storage alternate location at Quezaltenango.

2/ San Juan Ixcoy/Saloma alternate location at Huehuetenango.

3/ Of total $980,000 capital investment, $610,000 is for buildings, $370,000 for refrigeration equipment and miscellaneous equipment.

Table 2. Quantities & Prices of Crops for Storage, 100 Percent of Capacity

| | | |
|---|---|---|
| **Purchases:** | | |
| Potatoes | 2100 M.T. @ $130 | $ 273,000 |
| Onions | 1200 M.T. @ $158 | 190,000 |
| Garlic | 600 M.T. @ $360 | 216,000 |
| Apples | 500 M.T. @ $300 | 135,000 |
| | | $ 814,000 |
| **Sales:** | | |
| Potatoes | 2100 M.T. less 6% shrink<br>1974 M.T. @ $209 | $ 413,000 |
| Onions | 1200 M.T. less 6% shrink<br>1128 M.T. @ $295 | 333,000 |
| Garlic | 600 M.T. less 6% shrink<br>564 M.T. @ $480 | 271,000 |
| Apples | 500 M.T. less 6% shrink<br>470 M.T. @ $500 | 235,000 |
| | | $1,252,000 |

Table 3. 1982-83 Income Statement Small Farmers Marketing Storage Program (Operating at 50 % of Capacity)

| | | | |
|---|---|---|---|
| Sales | | | $ 626,000 |
| Cost of Goods | | | 407,000 |
| Gross Income | | | $ 219,000 |
| Expenses: | | | |
| Controllable Expenses | | | |
| Wages | $10,000 | | |
| Trucking | 8,000 | | |
| Supplies | 5,000 | | |
| | | $23,000 | |
| Noncontrollable Expenses | | | |
| Management | $25,000 | | |
| Depreciation -- Buildings | 25,000 | | |
| -- Equipment | 37,000 | | |
| Taxes (including Soc. Sec.) | 10,000 | | |
| Repair & Maintenance | 10,000 | | |
| Insurance | 20,000 | | |
| Utilities | 30,000 | | |
| Legal & Miscellaneous | 10,000 | | |
| Interest -- Investment--9% | 88,000 | | |
| *Interest -- Inventory--9% | 13,000 | | |
| | | $268,000 | |
| Total Expenses | | | $ 291,000 |
| Savings/Loss | | | Loss ($ 72,000) |

*Interest rates below 9% would substantially reduce first year loss. Interest on inventory is on highest likely inventory value in any one time period over an average of 5 months' storage period.

Table 4. 1984-85 Income Statement Small Farmers Marketing Storage Program (Operating at 75% of Capacity)

| | | | |
|---|---|---|---|
| Sales | | | $ 939,000 |
| Cost of Goods | | | 611,000 |
| Gross Income | | | $ 328,000 |
| Expenses: | | | |
| Controllable Expenses | | | |
| Wages | $ 15,000 | | |
| Trucking | 11,000 | | |
| Supplies | 8,000 | | |
| | | $ 34,000 | |
| Noncontrollable Expenses | | | |
| Management | $ 30,000 | | |
| Depreciation -- Buildings | 25,000 | | |
| -- Equipment | 37,000 | | |
| Taxes (including Soc. Sec.) | 10,000 | | |
| Repairs & Maintenance | 10,000 | | |
| Insurance | 20,000 | | |
| Utilities | 35,000 | | |
| Legal & Miscellaneous | 10,000 | | |
| *Interest--Investment--9% | 88,000 | | |
| Interest--Inventory--9% | 19,000 | | |
| | | $284,000 | |
| Total Expenses | | | $ 318,000 |
| Savings/Loss | | | $ 10,000 |

*Savings would increase substantially should Co-op obtain capital at lower interest rates.

Table 5. 1986-87 Income Statement Small Farmers Marketing Storage Program (Operating at 90% of Storage Capacity)

| | | | |
|---|---|---|---|
| Sales | | | $1,127,000 |
| Cost of Goods | | | 733,000 |
| Gross Income | | | $ 394,000 |
| Expenses: | | | |
| Controllable Expenses | | | |
| Wages | $ 20,000 | | |
| Trucking | 15,000 | | |
| Supplies | 10,000 | | |
| | | $ 45,000 | |
| Noncontrollable Expenses | | | |
| Management | $ 35,000 | | |
| Depreciation--Buildings | 25,000 | | |
| --Equipment | 37,000 | | |
| Taxes (including Soc. Sec.) | 10,000 | | |
| Repairs & Maintenance | 10,000 | | |
| Insurance | 20,000 | | |
| Utilities | 40,000 | | |
| *Interest--Investment--9% | 88,000 | | |
| Interest--Inventory--9% | 25,000 | | |
| | | $300,000 | |
| Total Expenses | | | $ 345,000 |
| Savings/Loss | | | $ 49,000 |

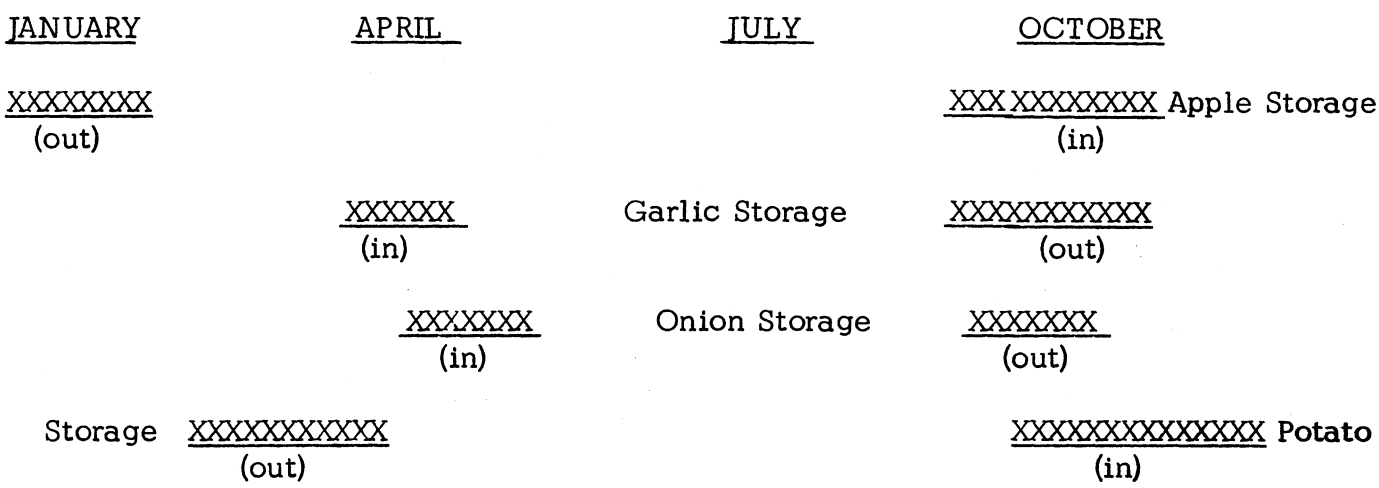
*Interest has been figured at highest likely rate. Should the Co-op secure a subsidized lower rate, savings would be substantially higher and breakeven point substantially lower. For example, if Co-op obtained 5% money, savings this year would increase to $99,000. This would provide a more reasonable return on investment of about 10%.

Financially, the storage program seems marginally feasible. Beyond this, however, is another effect that is emphasized by farm leaders. If some product can be stored for a period rather than marketed immediately during periods of normally heavy supply, farm income would likely be increased substantially as the deep low prices during these periods are avoided. In a similar manner, consumers would benefit by supplies sold from storage during usual periods of high prices which would tend to level these high price peaks. Both farmers and consumers should experience more stable prices.

The storage managers would work as part of the overall management team of the marketing organization with perhaps two storage managers supervising all storage activities and would work under the general manager of the marketing organization. One could become expert in onion and garlic storage, one in apple and potato storage, for example.

To re-emphasize total management, the general manager of the marketing organization would have the responsibility for the storage program in addition to the day-to-day buying and selling activities. The storage program should increase management's options to hold, sell, or store as the quantity and quality of the crops, price level, future crop prospects, and market demand forces give positive indications for actions. The storage program should strengthen the total marketing program given aggressive, competent management.

The marketing organization will need access to about $700,000 to finance inventory of crops in storage. The funds would be fully utilized in the fall of the year with smaller amounts required in the spring. The sketch below indicates the probable seasonal pattern of storage activity.




$250,000 should be provided for technical assistance and management training. The first phase of management training should take place on site in Guatemala and later in the United States with organizations active in storage of that commodity. An additional $200,000 should be provided to cover start-up costs and operating deficits of the first two years.